60p

THE Unexplained

MYSTERIES OF MIND SPACE & TIME

77

A great eccentric
Where dark forces meet
Making a time machine
The dinosaur debate
New light on leys

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THE Unexplained
MYSTERIES OF MIND SPACE & TIME

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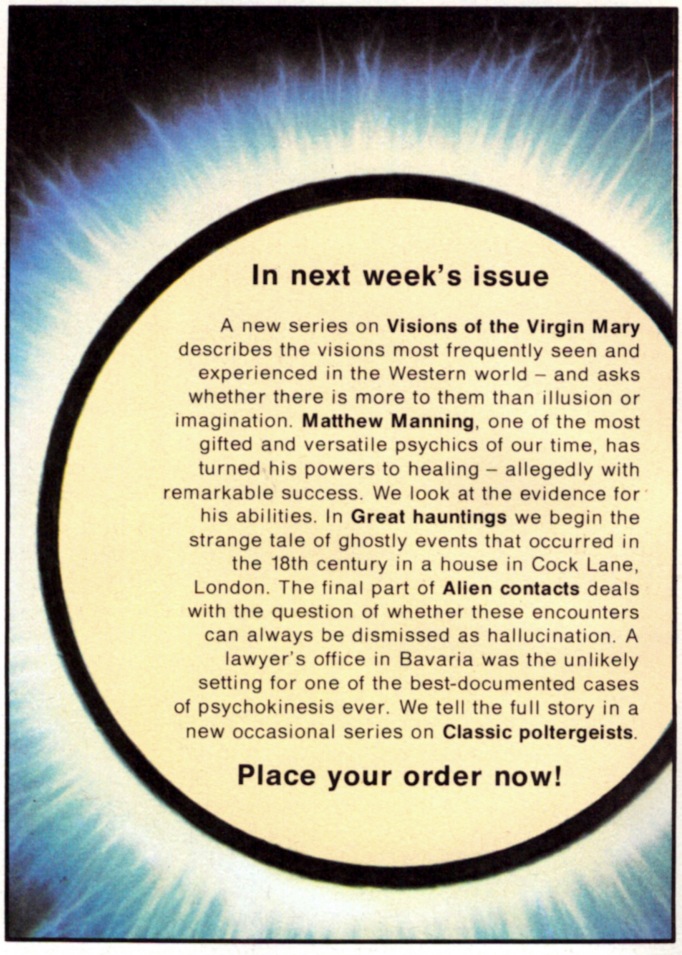

In next week's issue

A new series on **Visions of the Virgin Mary** describes the visions most frequently seen and experienced in the Western world – and asks whether there is more to them than illusion or imagination. **Matthew Manning**, one of the most gifted and versatile psychics of our time, has turned his powers to healing – allegedly with remarkable success. We look at the evidence for his abilities. In **Great hauntings** we begin the strange tale of ghostly events that occurred in the 18th century in a house in Cock Lane, London. The final part of **Alien contacts** deals with the question of whether these encounters can always be dismissed as hallucination. A lawyer's office in Bavaria was the unlikely setting for one of the best-documented cases of psychokinesis ever. We tell the full story in a new occasional series on **Classic poltergeists**.

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On the right lines?

Many cherished beliefs about ley lines are now being put to the test by hard-headed statisticians who are rethinking the mystical claims for these ancient 'lines of power'.

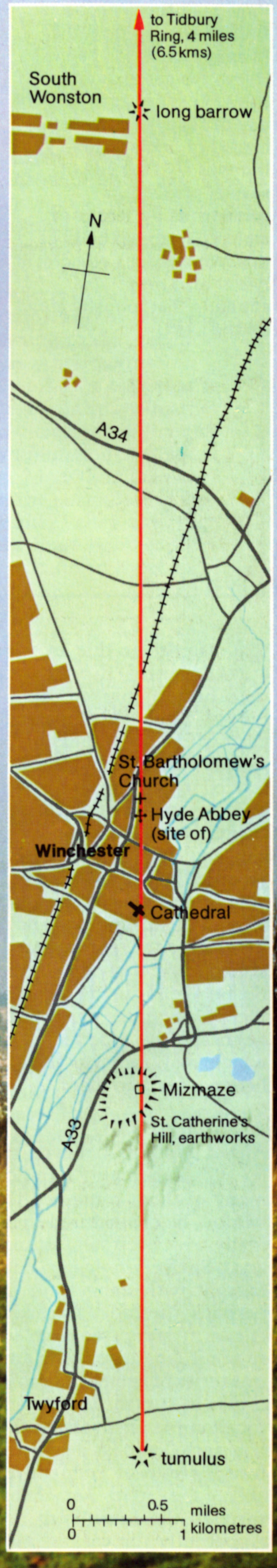
PAUL DEVEREUX describes their findings

INVESTIGATION OF LEYS – alignments of ancient sites – can be carried out in two ways: by treating them as topographical features, using maps, fieldwork and archives to identify them, or as supposed lines of force, using dowsing and other techniques. Since the 1920s both these approaches to the ley enigma have been developing. Some of the most exciting research has treated leys as carriers of 'earth energies' – but, of course, as the discoverer of leys, Alfred Watkins, pointed out, leys must initially be identified as *physical alignments* before more speculative research is undertaken.

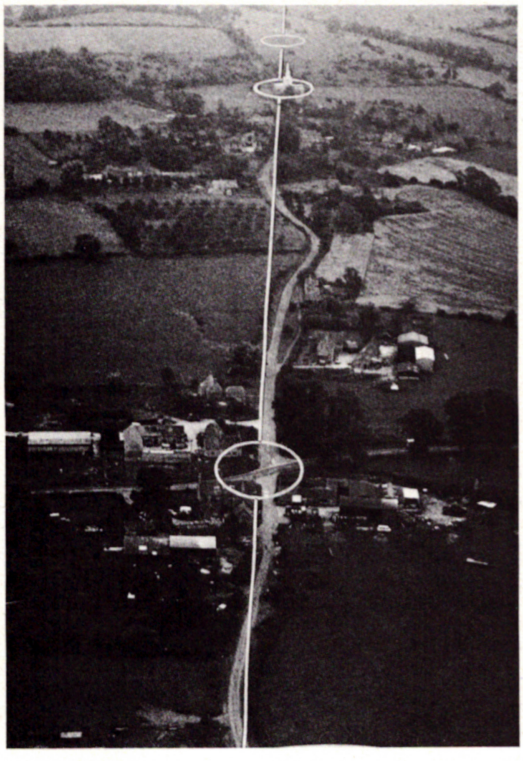
Ley hunting began in 1921 with Watkins's realisation that prehistoric sites – and later buildings associated with them – form straight lines across the landscape. Pioneer work was done in the two decades immediately before the Second World War, but it was not until the 1960s that ley theory caught the public imagination. Connections were seen by researchers such as Tony Wedd and Jimmy Goddard between leys and 'orthotenies' – straight lines that, it was believed, linked the sites of UFO sightings. This period marked a general rekindling of interest in leys and as such was important, but it was characterised by wild enthusiasm rather than hard research.

It was in the 1970s that the whole subject began to come of age. John Michell's *The old stones of Land's End* of 1974 was the first really careful, accurate study of leys as physical alignments. This work has subsequently been checked statistically by Chris Hutton-Squire and Pat Gadsby using computer simulation techniques. Some of the alignments between the standing stones of western Cornwall were found, from this statistical viewpoint, to be better than could be expected by chance. This result has been confirmed by two mathematicians, Bob Forrest and Michael Behrend, in work published in *The ley hunter's companion* in 1979.

One of the leys studied by Forrest and Behrend is the Saintbury alignment near Broadway, on the edge of the Cotswolds. It is about $3\frac{1}{2}$ miles (5.6 kilometres) long and appears to start at an ancient cross on an old, minor crossroads on the A46 near Weston-sub-Edge. This was a resting place for funeral processions on the way up to the next ley marker, St Nicholas's Church, which stands in an isolated position halfway up Willersey Hill near the village of Saintbury. The present church is Norman, and of a cruciform shape, but stands on the foundations of a Saxon church. It contains evidence of probable pagan origins in the form of a curious octagonal stone slab now preserved in the south transept, commonly known as the 'pre-Christian altar'. The hilltop above the church is crowned with the remains of a tumulus



Previous page: Winchester Cathedral, seen from the Mizmaze on St Catherine's Hill to the south; and a map showing Winchester ley. The city of Winchester was the capital of England until 1278 but was also the site of several prehistoric settlements. At least one eminent historian believes that Winchester Cathedral is based on a megalithic structure that formerly stood on the site

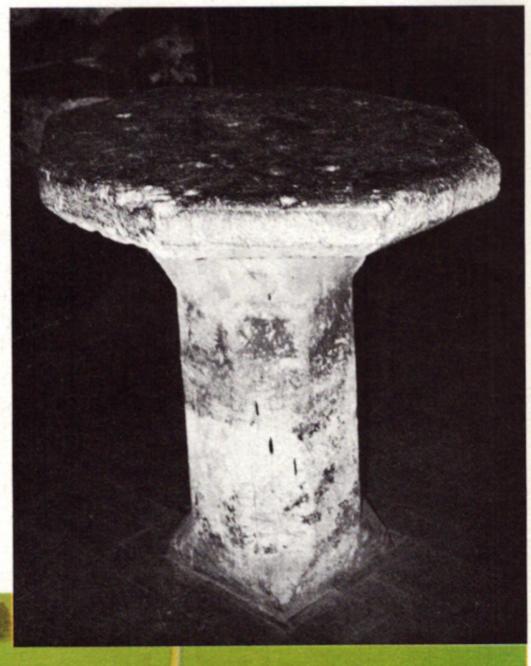


that also lies on this ley which, about a mile (1.6 kilometres) further on, passes over another hilltop marked by a Neolithic long barrow and encompassed by Iron Age earthworks. It is possible that the ley terminates here, though the line can be extended to pass through a pagan burial ground and Seven Wells Farm. Farms are not in themselves significant ley points, but wells can be, and this site is an ancient one recorded in the Domesday Book and it does contain seven wells. It is mentioned in Hugh Ross Williamson's 1948 novel *The silver bowl* in which a tale is recounted of a mysterious sacred relic that was hidden for a time at Seven Wells during the 17th century. From the air, the place is remarkable in that it is delineated by a perfect semi-circle of trees, which may indicate that there was once a henge structure there.

Above: aerial view of the north end of Saintbury ley in the English Cotswolds, showing the crossroads and a cross (in the foreground), with St Nicholas's Church in the background

Right: the so-called 'pre-Christian altar' in the south transept of the old Norman church of St Nicholas at Saintbury

Below: Seven Wells Farm on the Saintbury ley. Certainly an ancient site, the farm may have been built on a henge structure – and there really were seven wells



A pinch of salt?

Alfred Watkins believed that the names of ley sites were highly significant; noticing that many of them contained the words 'salt' or 'white', he conjectured that leys might originally have been salt trading routes (see page 474). Such etymological enquiries are always fraught with dangers of misinterpretation; perhaps the most fantastic example is the Alaise mystery (see page 861). But the need to see if language holds any clues about the mysteries of ancient alignment practices continues in current ley research. Jim Kimmis, for example, in an article in *The Ley Hunter*, has started a most promising line of enquiry into a group of Indo-European words that share the stem *reg*. Most have evolved through the Latin verb *regere*, 'to govern'. Apparently the earliest meaning of *reg* was 'movement along a straight line'. Kimmis suggests that as the word evolved 'it extended its physical/spatial meaning in an abstract sense, so that straight linear movement became an analogue of honesty, justice, government and social order.' He lists words that suggest this, among them: reign, regime, regiment, regular, regulation and right. Kimmis feels that the expression 'the king's highway', *via regis*, reveals a genuine historical link between the use of landscape alignments and the institution of kingship. The word 'ruler' in modern English, for example, can mean a king or queen, or even a state leader, as well as an instrument for drawing straight lines. In French, *règle* – straight-edge or ruler – reveals the *reg* stem clearly.

If this preliminary research is on the right lines, it may denote that the practice of setting out leys degenerated into a secular procedure associated with government – the 'ruling of the land'. We can see that a similar situation existed in the Andean empire of the Inca in which the divine king, the 'son of the sun', ruled with the help of a network of 'royal roads'. Nigel Pennick, one of the

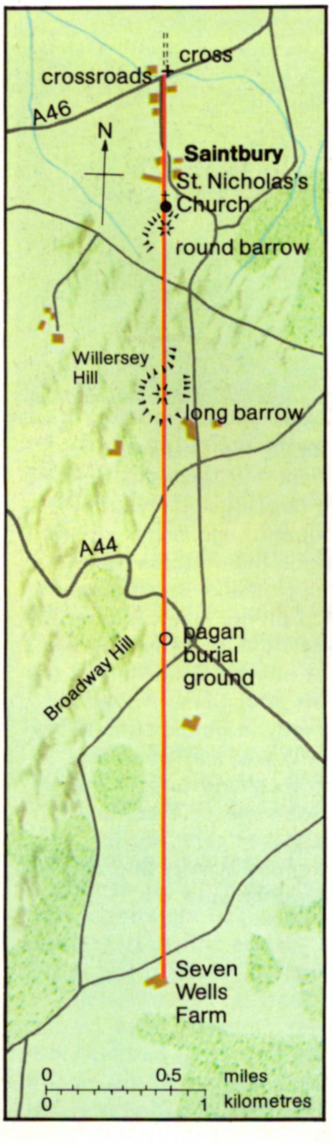
Luck and judgement

Ever since leys were discovered, controversy has centred on the question of whether or not these alignments appear accidentally in the landscape; it was in an attempt to provide an objective answer that statistics first became involved in ley research.

The most obvious starting point is to *assume* that leys are accidental, and then calculate just how unlikely it would be to find a straight line with a certain number of ancient sites – potential ley points – strung along it. It seems reasonable to interpret this assumption statistically by supposing that potential ley points are randomly distributed across the landscape; then, given the total number of such points, a simple calculation gives a guide to how likely it is that a ley with a certain number of points occurred by chance.

The problems start when you try to define what you mean by a random distribution. Statistically, a random distribution of a number of points on any particular map means that each point has an equal probability of appearing at any point on the map. But observation of acknowledged ancient sites quickly shows that their distribution is not, in this sense, random – it is well-known that they are, for instance, far more likely to be found on flat ground or at the top of a hill than on steeply sloping ground. What you need to do is to find a distribution that will model reality by assigning probabilities according to the steepness of the ground, plus other factors.

Unfortunately, this is a task that is beyond the scope of ordinary mathematics. What statisticians do in practice is to use computer simulation techniques on individual leys. Modelling the existing ley points and the surrounding topography by computer, they can then calculate an upper limit on the probability that the ley occurred by chance.



Below: map showing the major points on Saintbury ley in the Cotswolds. The ley, which is roughly 3½ miles (5.6 kilometres) long, begins at a 15th-century cross at the crossroads of the A46 and the main Saintbury road; it runs through Saintbury church, a Bronze Age round barrow, a Neolithic long barrow, a large Iron Age fort (part of which is now a golf course) and a Saxon pagan cemetery and ends at Seven Wells Farm. Alfred Watkins remarked that farmsteads occurred so frequently on leys that he hardly thought them worth recording; however, Seven Wells Farm had an attractively mystical name and seemed to be worth investigating

foremost researchers into leys and other aspects of geomancy, is also currently uncovering evidence of a system extant at one time in Madagascar where certain straight roads could be used only by the king.

One of the first things the human mind seems to do is to search for patterns in data, and in the 1960s dramatic networks of supposed leys criss-crossing Britain were published in various magazines. Some modern ley hunters cringe when these are brought up today by critics as they are impossible to defend as true leys. Two of the best-known of these patterns are Philip Heselton's 'great isosceles triangle' and John Michell's 'St Michael line'. The apex of the 'triangle' is at the henge and stone ring of Arbor Low in Derbyshire, with its base angles respectively at the church in Othery, Somerset, and Mersea Island off the Essex coast. This gives the figure sides of around 200 miles (320 kilometres) in length. The St Michael line is even longer, stretching from St Michael's Mount off Marazion in Cornwall, passing through Glastonbury, Avebury and Bury St Edmunds in East Anglia to enter the North Sea close to Lowestoft (see page 411).

Such long lines were called 'primary leys' – but current research shows that they are simply *not* precise alignments between sites, which is the definition of a ley. In the case of the great triangular configuration, it has since been clarified by Philip Heselton that it exists more as an *idea* than a topographical reality. John Michell still considers his St Michael line to have merit; in some respects it may have, but it is not one single alignment. To cover all the claimed sites along its length the line would have to be in the region of a mile (1.6 kilometres) in width. This still makes it narrow for its 360-mile (580-kilometre) length, but it is a far cry from a narrow ley-type alignment. This and similar features could be called *geomantic corridors* to distinguish them from simple leys. A few may be worthy of study – most are figments of the imagination.

Another durable myth that has survived from the 1960s is that between 50 and 100 leys cross at Arbor Low ('Arbor' means the centre or fulcrum). In fact, only two have been satisfactorily identified.

The shorter the better

There is no acceptable evidence that serious modern ley researchers are able to find that supports the existence of very long alignments of the 'primary ley' type. Another problem is that the Earth's curvature causes map lines representing alignments longer than about 25 miles (40 kilometres) to become significantly inaccurate representations of their counterparts on the ground, and the accurate plotting of such long lines becomes a fairly sophisticated trigonometrical enterprise. It is now clear that convincing leys tend to be under 20 miles (32 kilometres) in length, with some of the best being less than 10 miles (16 kilometres) long.

What *does* seem to be true is that sacred sites seem generally to be related to nearby 'holy hills'. This pattern was discerned in British leys through comparison with Bolivian old straight tracks that converge onto sacred hilltops and the research of Dr Josef Heinsch, who detected church alignments directed towards certain hilltops in his native Germany before the Second World War.

In Britain, many 'holy hills' are identifiable by their prehistoric earthworks or

structures, and are sometimes additionally marked by a hill figure. Somewhere near their bases there is generally an important shrine site – prehistoric or Christianised.

The well-known chalk hill figures of the Long Man of Wilmington, the Uffington White Horse and the Cerne Abbas Giant mark holy hills. At Wilmington in Sussex, the ancient church of Saints Mary and Peter aligns with the nearby Benedictine priory to the huge carved figure of the Long Man himself. The origin of this feature is not known, but is generally believed to date from the Bronze Age. The ley goes on over Windover Hill, on which the Long Man is situated, through a large prehistoric mound on its summit and on to a tumulus located on the other side.

The holy hill line at Uffington in Oxfordshire runs from the church of St Mary in the village, touches the curiously flattened Dragon Hill, passes through a long barrow on the slopes of Whitehorse Hill, through the prehistoric earthworks on top of the hill and on to a tumulus in the countryside beyond. The archaic outlines of the White Horse are to one side of the line. At Cerne Abbas in Dorset, it is again a church of St Mary in the village from which the line starts. The ley passes through a holy well known as the Silver Well – probably a pagan site, now associated with a St Edwold, that formerly had a reputation for healing – and the remains of Cerne Abbey before passing through the prehistoric earthwork known as the Trendle on top of Giant Hill. The Trendle used to be the site of the local maypole. Again the chalk hill figure – this

Above: the Cerne Abbas Giant – a Dorset hill drawing of ferocious virility and doubtful age; some experts argue that it dates back to the Romano-British period and others that it is only 300 years old. A ley line rises at the church of St Mary in the village of Cerne Abbas; nearby, a Benedictine abbey (left) was erected in the 15th century on a former pagan site, thus continuing unbroken centuries of religious activity at that particular spot

time the virile effigy of the club-wielding giant – is off the line to one side. At the earliest, this image is thought to date back to the Romano-British period, and Edward Waring in his *Ghosts and legends of the Dorset countryside* argues convincingly that the image may be a 17th-century folly. The line goes on over the long hill and ends, as is common with leys, at a tumulus beyond.

The old cathedral cities are generally associated with holy hills. Winchester, for instance, has St Catherine's Hill as its holy hill. A line runs through the site of Hyde Abbey in the city, through the cathedral – thought to be on the site of a former stone circle – and on over the top of the hill, which bears an earthwork, bisecting a curious and ancient design cut in the summit turf, known as the Mizmaze. Again, the line goes on to a tumulus.

At Hereford, the holy hill is Dinedor Hill, topped with prehistoric earthworks. The holy line runs through the ancient church of All Saints in the city, across the cathedral site and on to the hill's summit.

In all these cases, the lines are short. Alignments between a sacred site and its holy hill generally include other significant sites in the vicinity. In the case of the examples given here, *all* the major immediate sacred sites near the base of the given hills have been involved in the same lines.

Like beads on a thread

Research into the pattern of holy hill lines indicates that the orientation of the alignments tends to approximate to either north-south or east-west directions. All the lines described in this article have orientations close to north-south, but Dinedor, for example, also has a line that runs east from it to the prehistoric hill of Oldbury Camp, stringing three churches along its 7-mile (11-kilometre) length like beads on a thread. In London the holy hill of Ludgate, currently marked by St Paul's Cathedral but formerly by a pagan temple, is bisected by an east-west line running through the ancient sites now marked by St Clement Danes, the Temple, St Helen's and St Dunstan's in Stepney.

Critics argue that such lines are marked by features of such different ages that they cannot be valid. Ley hunters counter with the strong evidence for the retention and evolution of specific sacred sites through several different cultures right up to the Reformation and the remarkable regularity of the holy hill pattern. They also point to the precedent in Bolivia, where the landscape lines, obviously of pagan Indian origin, can be marked at one end by a Spanish church and at the other by a native Indian shrine.

There can be no doubt that a recurring pattern of alignments related to local holy hills exists in Britain. Throughout the world hilltops and mountains have been held by different cultures to be sacred: it is a constant motif in the nature mysticism that was practised by many early societies.

A shrine set up on an old straight track in the Bolivian Andes, where pathways have been cut perfectly straight through difficult scrubland for many miles. The Indians regard the tracks as both sacred and mundane, using them for worship and for everyday transport, just as English leys have survived the centuries with their alignments of holy places, wells, farms and commonplace roads

For the last 60 years or so argument and abuse have been the only communication between archaeologists and ley hunters. In 1981, however, for the first time, calm, rational discussion commenced between ley researchers and a leading archaeologist. In issue 90 of *The Ley Hunter* Professor R.J.C. Atkinson, one of Britain's most prominent prehistorians, famous for his work at Stonehenge, commenced a debate on the merits of the ley theory. At this stage the Professor declares himself an agnostic with regard to leys – he neither believes nor disbelieves. Such an open-minded attitude lends hope that the increasingly accurate and reasonable ley research continued in Britain and Ireland will lead to at least a partial acceptance by the establishment of the notion that in prehistoric Britain sacred sites were ranged across local landscapes in straight lines. The overriding question then will be – why?

On page 1576: the latest research into leys and earth energies

Out like a light

Sixty-five million years ago the dinosaurs vanished, with countless other species. Did the disaster originate on Earth or beyond it? FRANK SMYTH describes daring new theories on the death of the dinosaurs – and how they might have inherited the Earth

A STRIP OF REDDISH BROWN CLAY, half an inch (1 centimetre) thick, marks the place in the geological record where the dinosaurs died, about 65 million years ago. Normally it lies deep below the Earth's surface, sandwiched like jam in a sponge cake between the dirty white limestone of the Cretaceous period and the brownish limestone laid down over it during the Tertiary period that followed. Fortunately, geological upheavals in the past few million years have exposed this boundary at about 20 sites on the Earth's surface, enabling scientists to study it. That clay strip holds the key, they believe, to the dinosaur riddle.

One of the most noticeable features of the layer is its freedom from foraminifera, called 'forams' for short. They are a type of marine protozoa, simple single-celled creatures resembling amoebas, which secrete a shell-like substance to protect their soft bodies. In Cretaceous limestone their fossil shells are large enough to be detected with a large hand-lens, while in Tertiary limestone a powerful microscope has to be used to view them. But only long search and sophisticated instruments reveal them in the dividing layer. Like the other life forms, mostly of a primitive type, that bridged the gap between the age of the dinosaurs and the modern world, they had a hard time before they re-established themselves, but with bodies that were smaller than before.

While studying strata on a hillside near Gubbio in Italy in the mid 1970s, Dr Walter Alvarez, a Californian geologist, noticed the near-extinction of the forams. This convinced him that some huge catastrophe had overtaken the world. He took samples back to his father, Dr Louis Alvarez, a professor of physics at the Berkeley campus of the University of California.

Alvarez senior decided first to measure how long the boundary clay layer had taken to form. First he tested it for the presence of the element iridium and then he measured

Above: *Stenonychosaurus*, one of the later, relatively large-brained dinosaurs, with an intelligence as high as a modern opossum

Left: if the dinosaurs had survived, would they have developed like this? Dale Russell suggests that *Stenonychosaurus* could have developed a large brain, an upright posture to support the correspondingly heavy head, and shoulders, permitting the creature to throw heavy objects

Below: running behind the geological 'hammer', a thin layer of dark clay, lying above lighter-coloured rock, marks the end of the Cretaceous period and the time of mass extinctions

the amount present. Broadly speaking, if the amount of iridium was large, the clay layer would have formed over a long period, while if it was small, the layer would have formed over a short period.

This was because there was originally very little iridium in the Earth's surface rocks. The element filters down onto the surface through the Earth's atmosphere at a known rate, however. The more slowly the clay layer formed, the more time there was for iridium to accumulate in it.

Dr Alvarez's measuring was performed by an expensive process called neutron activation analysis. A sample of the clay was placed in the heart of Berkeley's nuclear reactor and bombarded with a flood of neutrons, a type of subatomic particle. The elements in the clay became radioactive, giving off gamma rays that revealed the identities of the elements present and their quantities. The amount of iridium discovered, though minute, was about 30 times larger than had been expected. It was far more than could have been laid down by the well-understood process by which iridium was deposited from the atmosphere. 'In no way,' said Alvarez, 'could it be accounted for by any known terrestrial geochemistry.'

So whatever caused the sudden iridium deposition came from space and may have been the factor that wiped out three quarters of the Earth's life.

Many scientists, including Dale Russell of Ottawa, had speculated on an extra-terrestrial cause for the dinosaurs' death – a supernova, or colossal stellar explosion. If this were sufficiently near, iridium-rich material could have been blown off the Moon. Some would reach the Earth. Living things would be more strongly affected, however, by the supernova's radiation.

Apart from the direct injury this could cause to land-dwelling life, it could have upset the Earth's climate, causing a massive change of sea level, and changing temperatures and patterns of rainfall. The resulting disruption of food chains in the oceans and on land would have killed off the dinosaurs, along with many other species.

Such explosions in our own Galaxy have been observed at least eight times in history, and with the aid of telescopes are regularly observed in other galaxies. But to affect conditions on Earth, a supernova would have to be, according to Alvarez, 'impossibly close' – doing far more damage than whatever it was that killed the dinosaurs.

There was a test that could be performed. A supernova would have produced quantities of platinum 244, a short-lived radioactive element. Using neutron activation analysis, Alvarez searched for this material in the clay layer. As in other geological strata, it was absent.

Returning to the problem of the high iridium level in the clay layer, Alvarez considered volcanic upheaval as a source. During a large eruption, iridium from the Earth's depths might be thrown up. But no volcanic eruption known could have produced iridium in the required quantities.

However, the impact of a very large meteorite can have effects like those of a volcano and can indeed trigger volcanic activity. Although meteorites are falling on the Earth continually, only about 200 have ever left craters sufficiently large to have survived to the present day. About 50,000 years ago a large meteor created the famous Meteor Crater, a scar in the Earth's surface 1300 yards (1.2 kilometres) across.

Model of catastrophe

At the California Institute of Technology Alvarez began tests to simulate the effects of a meteorite impact using an instrument called the light gas gun. It was a naval gun barrel filled with hydrogen gas; a plastic ram compressed the hydrogen, causing it to punch a projectile into a target at speeds of up to 15,000 miles per hour (24,000 km/h). Slow-motion film showed what happened at the moment of impact. Scaled up by computer, the experiment was a working model of what would happen to the Earth when a huge meteorite fell.

From his results Alvarez calculated that, in order to produce the quantity of iridium in the Cretaceous-Tertiary clay layer, a meteorite 6 miles (10 kilometres) across would have had to hit the Earth. It would have struck at 50,000 miles per hour (80,000 km/h) and forced into the Earth energy amounting to a billion times that of the Hiroshima atomic bomb.

This energy would vaporise surrounding rock and much of the meteorite itself, and throw out a shock wave that would produce a huge mushroom cloud. Dispersed by the hurricane winds created by the shock, this cloud would encircle the Earth.

And this would be disastrous. Plants use the energy of sunlight for their development and growth, and in so doing provide food for

animals. Deprived of light, this process, called photosynthesis, ceases.

Alvarez's thesis was that such a chain of events had happened, but there were several difficulties. None of the 200-odd existing craters was either old enough or large enough to fit the bill. More importantly, total darkness for anything over a year would cause life to die out almost completely. Evolution would have had to begin all over again. This most certainly did not happen.

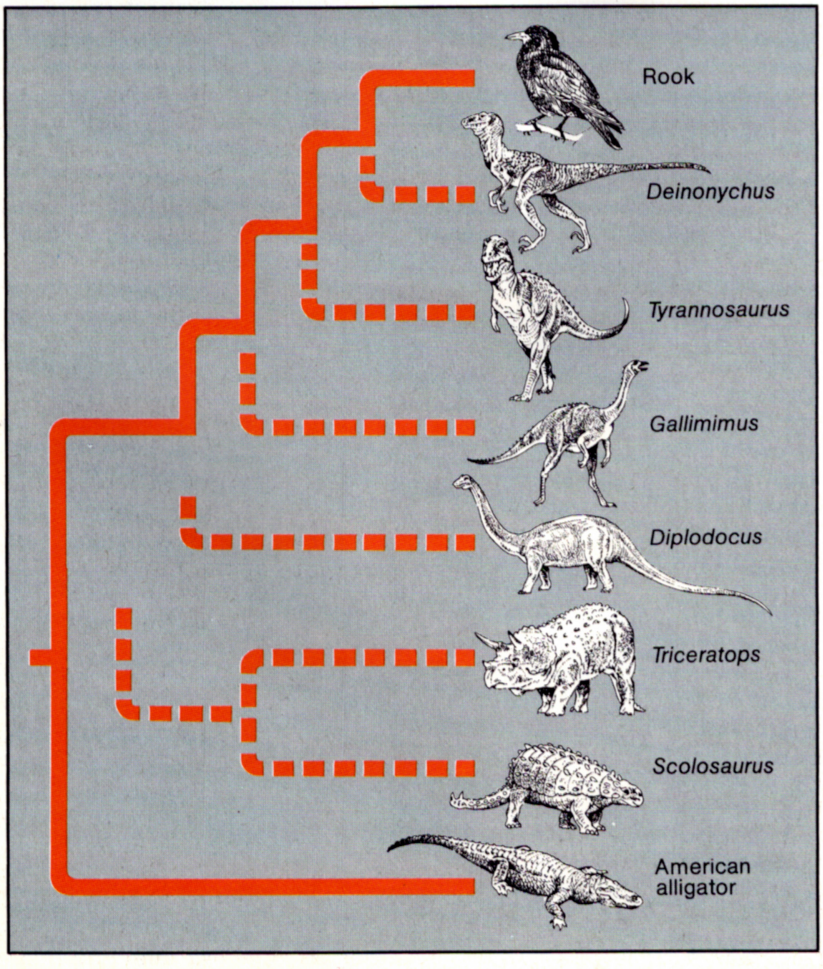
But there remained the possibility that the meteorite fell in the ocean. What would have happened in that case? Alvarez's colleague, the astronomer Dr Fred Whipple, began to make calculations. The Earth's crust in the continental areas is, on the average, 25 miles (40 kilometres) thick; but beneath the oceans it is much thinner. A body the size of the one postulated by Alvarez would easily penetrate the crust. If it struck one of the mid-ocean ridges, which are the scene of volcanic activity, it could trigger disturbances that would last for thousands of years, causing an island to build up.

If this is what happened, where is this island today? At first glance Iceland, which is about 60 million years old, seemed an ideal site, but it was ruled out after other geological evidence had been considered.

However, fossil remains had shown that at the end of the Cretaceous period the extinctions of plant species had been more severe from the Urals eastwards to the Rockies than elsewhere. This suggested that the impact site was originally in the North Pacific. The floor of the Pacific is one of the 'plates' that make up the outer layer of the Earth's 'mantle', which lies beneath the crust. The continents, made of relatively light rock, 'float' on their own plates. Each plate moves like a conveyor belt: in the case of the Pacific plate, new sea bed is formed at the south-eastern edge as fresh molten rock wells up from the Earth's depths, while the old sea floor moves north-westward before plunging beneath the Asian plate. A meteorite scar on the Pacific floor would long since have disappeared into the Earth's depths.

Alvarez, Whipple and their colleagues were encouraged by the work of Dr Nicholas Shackleton at the University of Cambridge in England. Shackleton had studied the fossilised forams in rock drilled from the bottom of the North Pacific's Tertiary strata.

Shackleton calculated that the sea water temperature had risen suddenly by up to 5.5°F (3°C) at the beginning of the Tertiary, and that the temperature had remained high for between 10,000 and 100,000 years. The carbon content of the rock revealed a 'massive decrease in the productivity of the



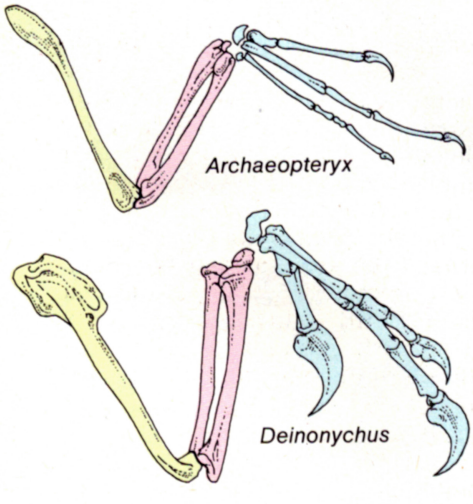
Meaningful relationship?

Palaeontologists work out the probable ancestry of ancient species, both extinct and living, by a careful comparison of the resemblances and differences in their structures. A feature that is common to two different species because it has been inherited from some common ancestor is called a homology. Examples are the feathers of birds, which are regarded as showing their common ancestry. The relationships inferred from studying homologies are shown in a 'cladogram' ('branching diagram'), like that at the left. This one shows that, among the dinosaurs, *Deinonychus* is more closely related to *Tyrannosaurus* than to *Gallimimus*: the first two have a common ancestor not shared by the third. *Triceratops* is more distantly related still, because it has a yet more remote ancestor in common with the previous species. The dotted lines and gaps signify the great uncertainties in fossil lineages.

The diagram shows what are currently believed to be the likely relationships of the dinosaurs with some modern creatures. Birds, crocodilians (which include crocodiles and alligators) and the dinosaurs all had some distant ancestor. The birds seem to be much more closely related to certain dinosaur species than

Above: *Deinonychus* gets its name from the Greek meaning 'terrible claw'. Fast-moving and up to 9 feet (3 metres) long, it could use its hind claws as fearsome weapons. It probably used its outstretched tail to provide balance when it was running at full speed

Above left: Meteor Crater, a bowl 1300 yards (1.2 kilometres) across, was blasted out of the landscape of Arizona, USA, 50,000 years ago. The meteorite that caused it was puny by comparison with the asteroid-sized object that, according to some scientists, caused the death of the dinosaurs



do the crocodilians, however. The bones of the forelimbs (above) are closely homologous and the wristbone (the uppermost bone in these diagrams) is especially convincing to palaeontologists.

Archaeopteryx, the first known bird, had feathers and wings, but opinions differ as to how well it could fly. The traditional view, still widely accepted, holds that it descended from the common ancestors of all reptiles, rather than from a dinosaur.

It is by numerous features, as well as these, that palaeontologists have concluded that birds are the closest relatives of the dinosaur surviving today.

Further reading

Alan Charig, *A new look at the dinosaurs*, Heinemann 1979

Kai Petersen, *Prehistoric life on Earth*, Eyre Methuen 1978

Z.V. Špinar, *Life before Man*, Thames and Hudson 1974

oceans' during this period: a great deal of life had disappeared from the shallower waters, while deep-living organisms had survived.

The superheating of the ocean is just what would be expected if a meteorite were to smash into the sea bed. There would have been one significant difference between an impact in the ocean and one on land. In the case of a sea strike, millions of tonnes of water, largely in the form of steam, would have accompanied the mineral debris into the atmosphere. Total darkness would have enveloped the Earth, but only for a matter of hours or days: torrential global rains would have swilled much of the dust from the sky, allowing sunlight to filter through.

But plant life on land and in the sea would have been seriously damaged, with disastrous effects on the animals that fed on them. Furthermore, millions of tonnes of water vapour would hang in the atmosphere for years, creating a 'greenhouse effect' – a worldwide rise in temperature. This stifling humidity could have killed the dinosaurs – even those best adapted to temperature changes, such as the more mammalian species, and those equipped with thermostatic 'sails' and plates on their backs. Only the smaller species, including Man's ancestors, lived on to inherit the planet.

This may be the answer to the problem of the disappearance of the dinosaurs. It leaves a greater question: how would the dinosaurs have developed had they survived? Dale Russell is certain he has the answer:

> There has never been any evidence that dinosaurs as a group were on a decline. If they hadn't been wiped out they would have continued to prosper. They had kept the mammals down for a hundred million years. Some dinosaurs would have undoubtedly grown highly encephalised – large-brained – exactly like ourselves. They may well have been ruling the world today.

Britain's greatest crank

Jesus was crucified in ancient Edinburgh; Bath was classical Athens . . . these were among the colourful views of patriot, journalist and crank Comyns Beaumont. PETER JAMES examines Beaumont's fantastic ideas

INVESTIGATION INTO THE MYSTERIES of the ancient world can be a head-spinning task. Not many authors feel they have hit upon *the* solution to age-old problems of history and religion, and have then pursued their flash of inspiration through thick and thin, disregarding all the evidence to the contrary. Such an approach is definitely the hallmark of a crank, though this is a label to be applied with care. Dr Immanuel Velikovsky, controversial author of *Worlds in collision* (see page 1181), was accused of crankery on the publication of his astounding and far-reaching claims, which flew in the face of the conventional view of world history.

But Velikovsky was not the first to attempt such a massive revision of the accepted view of world history. A previous, even more extreme, stab at a grand rewriting of the past had been made in the 1940s by the eccentric English theorist Comyns Beaumont. Like Velikovsky a catastrophist, Beaumont developed his own theory of a collision between the Earth and an enormous comet. He also went on, like Velikovsky, to question the accepted dates for various geological ages, and composed his own version of Egyptian history.

But where Velikovsky was satisfied with suggesting a 'revised chronology' for the ancient world, Beaumont went further still and beguiled his readers with the remarkable idea of a 'revised geography' for Man's history. In three volumes, he presented the case for one of the most fantastic assertions ever to reach the printed page – that all the events described in the Bible, and most of those in Greek myth and history, took place on the soil of the British Isles or closely neighbouring countries. The geography of the ancient world had been distorted, he argued, by the misunderstandings (or deliberate falsifications) of later Greek and Roman historians, and the 'truth' had been covered up. It was Beaumont's privilege to 'rediscover' the ancient centres of Israel, Judah, Greece and Egypt in the green and pleasant lands of England, Scotland and Wales. His theories made the far-fetched claims of the 'British Israelites' – Victorian eccentrics who believed the Anglo-Saxons were descended from the 'lost tribes of Israel' – seem restrained.

Strange though it may seem, there is no good reason to believe that Comyns Beaumont was actually insane. Born into a

Right: the hanging gardens of Babylon – a beautiful, if decadent, centre of ancient civilisation, which archaeologists place in modern Iraq. Comyns Beaumont, however, knew better – it was clearly Rome, a city comparable in splendour and sin

Far right: mosaic in St Mark's, Venice, showing scenes from the story of Noah and the Flood. Beaumont considered Mesopotamia an unlikely spot for the Deluge – the Atlantic, he claimed, was the real site

Unfettered by considerations of logic or proof, Comyns Beaumont (left) developed a meticulous 'revised geography' to show that all the important classical and biblical sites were in Britain (right) which, many thousands of years ago, had also been Atlantis

family of landed gentry claiming descent from the Normans, he worked for a while in diplomatic service before becoming a journalist. He enjoyed a long and successful, albeit chequered, career as editor and writer for a host of English newspapers and popular magazines, playing an important part in the publishing business throughout the difficult years of two world wars. Yet, although he was extremely intelligent and erudite, Beaumont completely cast loose from the anchor of reason in a ruthless pursuit of his *idée fixe* – that Britain had been the motherland of world civilisation, an idea epitomised in the title of his last book: *Britain: key to world history*.

Although it is difficult to follow much of the reasoning behind Beaumont's extravagant proposals, one can trace out a fascinating, if disjointed, trail of wayward logic in his work, which began with some intriguing speculations but led to confusion and eventually self-contradiction.

In the foreword to *The middle of prehistoric Britain* Beaumont explained how he 'stumbled rather than deliberately walked into a recognition that the history of remote days as passed down was based on false

premises in regard to the most famous of ancient peoples, both in regard to geography and chronology'. He was originally fascinated by the perennial problem of the location of Atlantis, the legendary cradle of civilisation, now apparently submerged beneath the waves. Since the Greek philosopher Plato – to whom we owe the original Atlantis story – located the island in the Atlantic Ocean, Beaumont had little difficulty in following his patriotic inclinations and identifying it with the British Isles. Here, after all, are to be found the earliest traces of human habitation of any of the Atlantic islands. And the story of Atlantis's destruction, he reasoned, concerned the break-up of an extended British land-mass that once stretched towards Scandinavia, resulting in the formation of the islands now known as the Shetlands, Hebrides and Orkneys.

Then came the deluge

In Plato's account, the rich and powerful Atlanteans became corrupted by centuries of materialistic indulgence. Annoyed with their immorality, the gods destroyed their land with earthquake and flood. As Beaumont – and many others – noticed, this motif of a degenerate first race destroyed by natural catastrophe neatly parallels the biblical (and ancient Near Eastern) story of Noah's Flood, sent by God to obliterate the sinful.

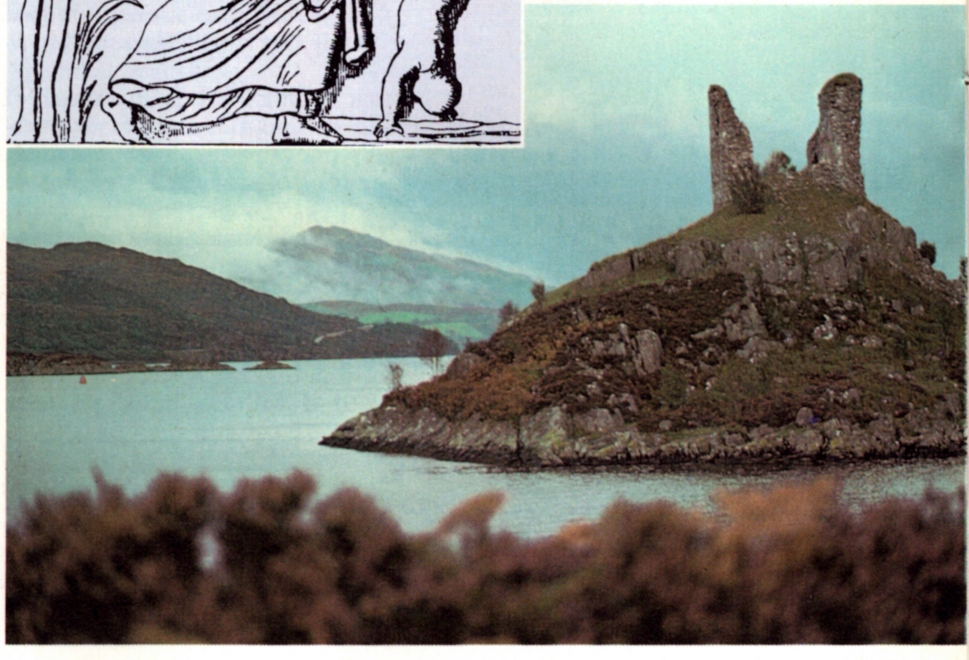
Many have argued that a common origin for such myths, even the possibility of a real universal deluge, should be considered. But Beaumont had the temerity to turn the tables completely on the traditional view and insist that the Flood had taken place in Britain rather than Mesopotamia. And if the Flood was an Atlantic event, then maybe Noah, and even the Hebrew patriarchs who followed him, were not really at home in the Near East, but in north-west Europe. Beaumont mused on the antiquity of the human remains from the Atlantic coastal region, from the cave-paintings of the Dordogne to the profusion of megalithic remains found in the Orkneys. The Near East, at least at the time

of Beaumont's writing, seemed to have comparatively little to offer in terms of prehistoric remains. For Beaumont it was logical to assume that north-west Europe was the real home of civilisation and the cradle of mankind described in so many mythologies – call it Atlantis, Merope, Crete or the Garden of Eden.

He easily mustered support for this flash of inspiration with a hotch-potch of legends from many Old World cultures telling of a land of the gods, spirits or the dead that lay in the west. The widespread idea of a spirit land to the west is actually almost certainly due to the fact that this is the direction of the setting – or 'dying' – Sun. But Beaumont preferred a literal interpretation. Wringing every geographical clue he could from the myths, he fearlessly identified the Hades of Greek myth (the Amentet of the ancient Egyptians) with a group of islands off the coast of western Scotland. His feverish imagination led him to see, in the innocent Loch Carron and the nearby hamlet of Erbusaig, the hellish river Acheron and the Greek purgatory Erebus. The famous burning river of Hades, the Styx, was seen in Loch Alsh and became the starting point for Beaumont's next extraordinary theoretical leap. The Greek hero Achilles was dipped in the river Styx by his mother to make him immortal, and then spent his childhood on the rocky island of Skyros. With great excitement Beaumont relates the striking confirmation of his theory – at the mouth of Loch Alsh lay the island of Skye, 'unmistakably' Skyros!

After this revelation, there was no turning back. Skyros, unlike Erebus and Acheron, was not a mythical place but a historical location. To make things fit, Beaumont studiously shunted the various countries of classical Greece known to surround Skyros around the Scottish Highlands. He followed this up by scattering the peoples and places of the Old Testament around the map of Britain. Having taken the plunge, Beaumont dived deeper and deeper into the gulf of speculation and came up with what seemed to him to be pearls. Surely, he reasoned, the Ionian Greeks had lived in Iona. The Scottish partiality for the name Alexander clearly reflected the days when Alexander the Great had lorded it over the British Isles. And weren't the Faeroe Islands so called because they were once ruled over by a pharaoh?

Left: Achilles is dipped into the Styx to make him immortal. Beaumont believed that Loch Alsh (below) was the Styx and that Skyros, where Achilles was said to grow up, was the Isle of Skye

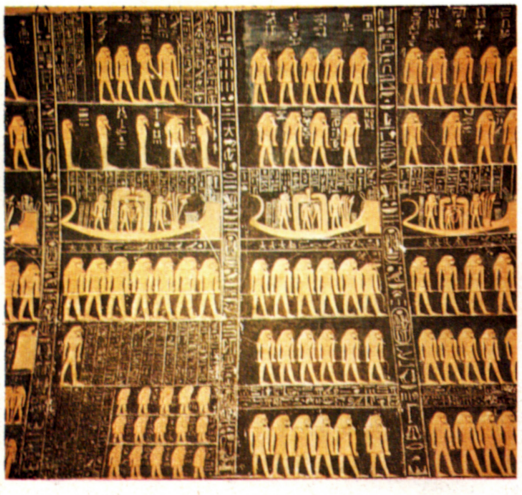


Below left: Bath, a city with a long history. But none of its records mentions that it was once commonly known as Athens (below right), as Beaumont claimed. Take away the B and add 'ens' – and Bath becomes Athens, said Beaumont

Site by site, all the important centres of the ancient world were whisked away from the Mediterranean and Near East and arranged into a fantastic constellation around the North Sea. Wales became Galilee, Somerset Egypt and the river Severn the Nile. Hamburg in Germany, not Hissarlik in Turkey, had been the site of the Trojan War. Babylon was clearly Rome, not some insignificant mud-heap in Iraq. Snowy Ben Nevis was graced with the title of Olympus, home of the Greek gods. And the inhabitants of Bristol – had they known – would have been surprised to learn that their city was really Sodom, renowned in the Bible for its wickedness. The crowning glory of Beaumont's work was to discover the 'real' location of the holy city of Jerusalem, and to trace the events leading to Christ's crucifixion through the streets of Edinburgh.

Right: Xerxes leads his army to attack Greece. Beaumont corrected the errors of centuries and relocated Greece in Britain. Xerxes, he said, had to march through Scotland to reach it

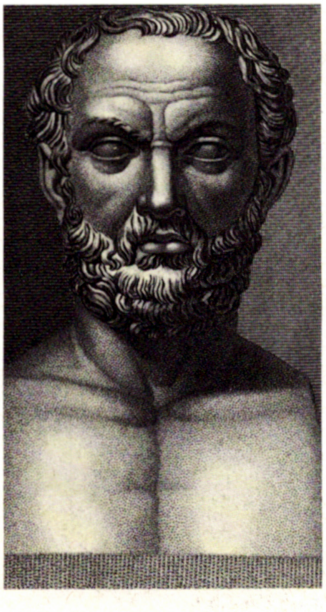
Below left: Egyptian hieroglyphics on the wall of a tomb in Egypt – not Scotland, as Beaumont believed. He used the Egyptian Book of the Dead to 'prove' that the Egyptian Underworld was really Fingal's Cave on the Scottish Isle of Staffa (below)



By now completely up a gum-tree, Beaumont's enthusiasm had led him into a world of inconsistent and facile methodology. While using the translation of the ancient Egyptian Book of the Dead to 'prove' that Fingal's Cave on the Scottish island of Staffa was the location of the Egyptian Underworld, he also had to deny that Egyptian hieroglyphics had been deciphered – he even asserted they were, in fact, untranslatable gibberish. And when we are asked by him to believe that Athens was really Bath – because one can ignore the B and add 'ens' – then it obviously becomes superfluous to subject Beaumont's work to any serious critique. One should simply enjoy it. Beaumont's work became so undisciplined that any hope of scientific merit was left by the wayside. But he takes the prize for sheer extravagance of imagination.

It is to be regretted that Beaumont's promised further study of ancient history was never published. In this he planned to show how geography had been distorted by the massive migrations of peoples from Britain and by the deliberate falsification of Greek historians such as Herodotus and Thucydides. We were also to be entertained to an account of how Xerxes's Persian army had marched through Scotland to attack a Greece relocated through the length of the British Isles.

Below: Thucydides, one of the wayward Greek historians responsible for the widespread prejudice against an English Greece – according to Beaumont. In fact, every single historian was seen as a liar or a cheat. Only Beaumont was right



How a man of Beaumont's undoubted intelligence can have so deluded himself is difficult to imagine, but the *why* is clear. Beaumont was motivated by an intense patriotism, a force that coloured his career as an editor and journalist as well as his view of ancient history. Basically liberal, but intensely nationalist, his greatest belief was in Britain as the fount and mainstay of democracy, and he drifted from newspaper to newspaper in an endless quest for a publication that he felt really served the interests of the British people rather than that of financial operators. The ups and downs of his career were described in his autobiography, *A rebel in Fleet Street*.

Were he alive today, Beaumont would have been delighted to learn that ancient Europe's role in the rise of civilisation has now been restored by the archaeological discoveries of the 1970s. But nothing, unfortunately – apart from the acrobatics of an overwrought imagination – can ever transfer the scene of biblical stories and Greek myth to Beaumont's beloved homeland. Egypt remains in Egypt, and Greece remains in Greece, despite the earnest endeavours of Britain's greatest crank.

Blueprint for a time machine

If time travel is possible in principle, how can it be achieved? JOHN GRIBBIN explains how super-dense neutron stars could be the means by which, one day, space travellers will be able to journey into the past

Above: a nearby artificial satellite draws a streak of light across the background of thousands of distant stars revealed by a long-exposure photograph. Many astronomers believe that, in the immensity of our Galaxy, there are numerous black holes. Will they one day be harnessed for time travel?

THE PHILOSOPHICAL DEBATE about the paradoxes of time travel makes one thing clear: it is possible to imagine ways in which the Universe may be constructed so that time travel, of some kind or another, may be allowed by the laws of physics. That leaves the big question: is time travel *really* possible? And, if so, how could a time machine be built?

During the 1970s, there was a great deal of excitement about the implications of the existence of black holes for time travel. A black hole is a region of space in which enough matter is concentrated for gravity to make a 'hole' in space-time, a region from which no energy – light energy included – can escape (see page 30). The idea of black holes as holes in space is an entirely respectable part of modern astrophysics, and they are invoked by scientists to explain a number of strange phenomena. Energy released from black holes could, for instance, explain the genesis of high-energy X-rays that have been observed in our own Galaxy and, on a much grander scale, the energy sources that appear to lie at the centres of certain galaxies. A black hole is a hole in space – but, as Einstein taught us, space and time are inseparable, two facets of space-time. It seems reasonable to suppose that a hole in space must also be a hole in time, whatever that means – and if it were possible to travel 'through' a black hole, we might emerge in some other place, perhaps even another universe, and at some other time. Unfortunately, however, such speculation seems to be nothing more than science fiction, because the journey through the black hole would crush you to death and rip you apart simultaneously. But nevertheless, the discovery of black holes has set a whole new generation of theorists thinking about the possibility of time travel.

According to modern theories of space-time – refinements of Einstein's theory of general relativity – the key to time travel is not black holes, but what are called naked singularities. A singularity is a place where the laws of physics as we know them break down – as in the heart of a black hole, for example, or in the Big Bang in which the

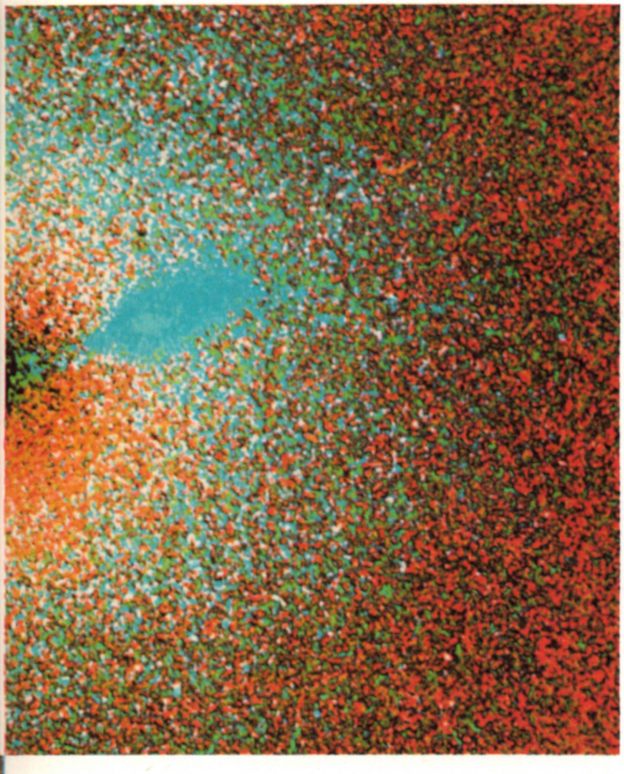
Universe was created – and where space and time cease to exist. In a black hole, the singularity is 'veiled' by an event horizon from which no information can escape. Some scientists, supporters of the 'cosmic censorship' theory, believe that this is *always* the case – nature always hides its singularities. Others, however, believe that singularities can sometimes become visible: theorist Stephen Hawkins has shown that black holes gradually 'evaporate' to expose the singularities – naked singularities – at their hearts, and some scientists believe that when matter rotates too fast to become a normal black hole, it can become visible from certain directions – that is, it does not form an event horizon (see page 41).

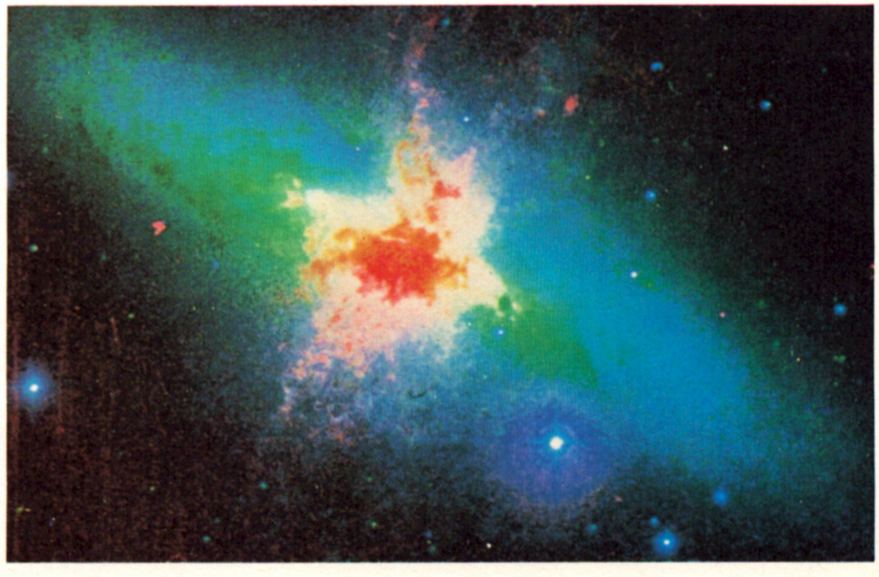
Now *if* a naked singularity exists in the Universe, then it is possible, according to the laws of physics, to travel in an orbit 'around' the singularity – an orbit that takes you first into the future or past, then back home to the time and place you started from. Such an orbit is called a *closed timelike line* – and, of course, it implies the possibility of time travel and all the philosophical problems it entails. It is small wonder that it has caused dissension among the scientists. One school of thought believes that, because naked singularities imply the existence of closed timelike lines, naked singularities cannot exist. Another group of theorists points out that the Big Bang in which the Universe was born may have been a bursting out from a singularity, like a black hole in reverse; thus at least one naked singularity may not only have existed, but may have been the cause of our Universe coming into existence. And if a naked singularity once existed, inside the Universe, then, because the closed timelike lines associated with it remain fixed for all time, it influences the whole future of space-time. If we could only find it, we would have a ready-made time machine with which we could visit any time since the beginning of the Universe.

But most startling of all are the ideas of a maverick American theorist, that not only may closed timelike lines exist, but it might one day be possible for mankind to *create* them. With 20th-century physics and engineering as his guide, Frank Tipler has sketched out plans that a future civilisation might use as a blueprint in building a time machine.

Tipler's work, published in respectable journals such as the *Physical Review* and *Annals of Physics*, is necessarily highly mathematical and not always easy for the uninitiated to follow. But when asked straight out 'Is time travel possible?', he replied: 'My current view is that there is indeed a real theoretical possibility for causality violation in the context of relativity theory.' Remember that, in scientific terms, 'causality violation' implies 'time travel'! The tricky mathematical part of Tipler's work is the calculation that time travel is allowed within the laws of relativity theory. The Universe does 'allow' time travel after all, and there is no known reason why closed timelike lines should not exist in the real world. The next question Tipler looked at was whether the conditions appropriate for time travel to take place could arise naturally in the Universe. Finally, he has looked at the possibility of building an artificial time machine.

The crucial factor, Tipler discovered, is the existence – or creation – of a massive, rotating object. A large amount of matter concentrated in one place distorts the fabric of space-time by gravity (see page 42). If the object also rotates, then space-time is twisted still more by the rotation, as the firm grip of gravity tries to carry the fabric of space-time round with the rotating mass. For some

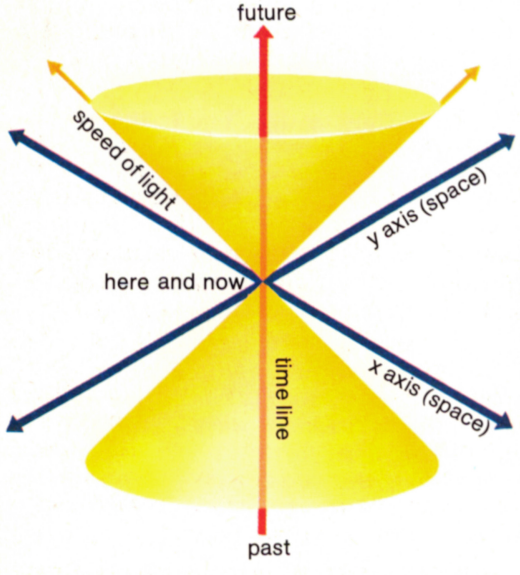




Two possible sites for black holes. In the computer-processed image of M87, one of the largest galaxies known (left), a hot bright jet of matter, emitted from the galaxy's core, can be seen. The jet sends out enormous quantities of energy in the form of light and radio waves. The source of the energy may be a black hole at the galaxy's centre. The same explanation has been invoked for the enormous explosion that is occurring at the centre of the galaxy M82 in Ursa Major (below). Like all proposed black hole identifications, these are highly controversial

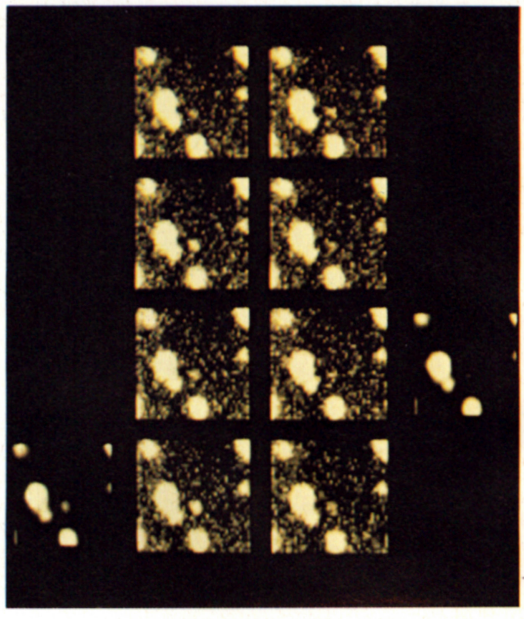
combinations of mass, density and angular velocity a singularity can be formed without creating an event horizon. The region of distorted space-time around this naked singularity is called, logically enough, the 'strong field' region, referring to the gravitational field. Tipler has proved that a traveller from a weak field region – the Earth, say – could go to a strong field region near such a rotating object, move in the direction of negative time, and then return home to the weak field region without ever violating any known physical law. He would return to find himself in the past, returning to Earth, if he wished, before he left. Building a time machine is impracticable now. But that may not always be the case.

A working time machine can be constructed, in principle, by taking a sufficiently massive but compact lump of material – any material – and making it spin fast enough. Strictly speaking, the rotating material ought



In space-time diagrams two space dimensions are shown; the third represents time. The 'light cones' (left) represent a light wave converging and spreading out again. Only journeys within cones (that is, slower than light) are possible. But near a massive rotating object (below) light cones are tilted. Journeys can lie within a cone, yet go backwards in time

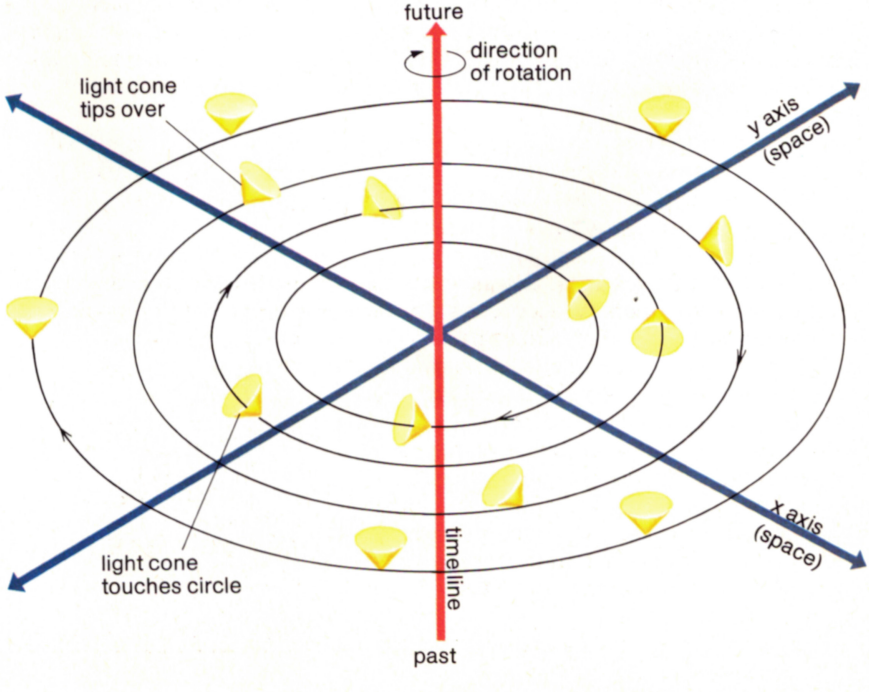
Right: a pulsar lying among stars in the constellation of Vela flashes on and off. These pictures were made with sensitive electronic detectors connected to a telescope. 'Noise', similar to television interference, obscures the original eight pictures. The computer-enhanced pictures flanking the central sequence show the pulsar at maximum and minimum brightness. In the left-hand picture it is a faint dot just below the centre that is absent in the right-hand picture. Theoretically pulsars could be harnessed in the future for purposes of travel forwards and backwards through time



to be in the form of an infinitely long cylinder, but Tipler believes that a cylinder 10 times longer than its diameter probably has the right proportions to do the trick. How much mass do you need? Astronomers know that in the last stage of compression before the black hole state, objects called neutron stars exist in the Universe. Such a star might contain as much matter as our Sun, packed into a volume no more than 15 miles (24 kilometres) across; the name 'neutron star' tells us that the density of such a star is roughly the same as the density of neutrons in the heart of an atom. A neutron star is, in effect, a whole star compressed to the density of an atomic nucleus. Keeping the mass of the Sun as an approximate guide, our working time machine could be made from a neutron star squeezed into the shape of a cylinder 7 miles (10 kilometres) across and 70 miles (100 kilometres) long, rotating twice every millisecond, with the rim of the cylinder moving at half the speed of light.

It sounds outrageous. But in the late 1960s, astronomers discovered sources of rapidly pulsing radiation in our Galaxy. These sources, dubbed pulsars, are now explained as rapidly rotating neutron stars. Some of them spin at a rate of once very few milliseconds; most have a mass about the same as our Sun. Of course, the spin isn't quite fast enough to make them time machines, and these spinning neutron stars are not stretched into elongated cylinders. But the description of a pulsar is tantalisingly close to Frank Tipler's description of a working time machine.

Here, perhaps, is the way some future spacefaring civilisation might set about making a time machine. First, choose a suitable pulsar. Stretch it into an elongated cylinder, increase its spin appropriately, and you can open for business. There are just two remaining snags. First, such a time machine



works only from the moment of its creation. Once it is made, you can use it to go forward in time and return to your starting time, but you can never go back to a time before the naked singularity came into being. Secondly, says Tipler, time travel might need rather a lot of energy. If you imagine sending a physical object on a closed timelike loop so that it ends up alongside itself, then in effect you have created a duplicate of the original object. Einstein's equations tells us that mass is equivalent to energy, according to the familiar equation $E = mc^2$. Creating amount m of mass requires energy mc^2, and c is the speed of light, 186,000 miles per second (300,000 km/h). So Tipler believes that a working time machine could most probably be used in practice only to send messages, not material bodies, through time. On the other hand, a civilisation capable of sculpting neutron stars into time machines might have energy enough to squander on physical time travel as well.

The problems of causality violation remain. One of the shortest stories ever published by science-fiction writer Larry Niven has the title 'Rotating cylinders and the possibility of global causality violation'. Niven stole the title, he acknowledges, from one of Tipler's erudite articles in the *Physical Review*. The story describes a future civilisation that tries to take Tipler's work to its logical conclusion and build a working time machine. Every time the work nears completion, some catastrophe strikes the builders. The punch line comes when another race discovers a half-built time machine and decides to finish the job; at the moment the leader of the civilisation decides to proceed with the project, the sun in the sky of his planet blows up as a nova and his civilisation is destroyed.

Violating causality

Niven's frightening story highlights the implication of the argument that causality violation is abhorrent to nature, taken to its logical conclusion. The illogicality of the story may be a kind of double bluff, representing Niven's own attempt to make us, the readers, say 'but that's ridiculous', leaving us with the only possible alternative – that causality violation really is possible after all. Tipler, cautiously, says only that 'we are a very long way from completely resolving the causality violation question.' But that, coming from a respected mathematical physicist with a thorough knowledge of Einstein's theories, speaks volumes. At the very least, if anyone ever tells you flatly that 'time travel is impossible', you can be sure that he doesn't know what he is talking about. The fairest answer modern science can give to the question, 'Is time travel possible?' is 'We don't know.' And that, of course, means that perhaps it is possible to travel in time after all.

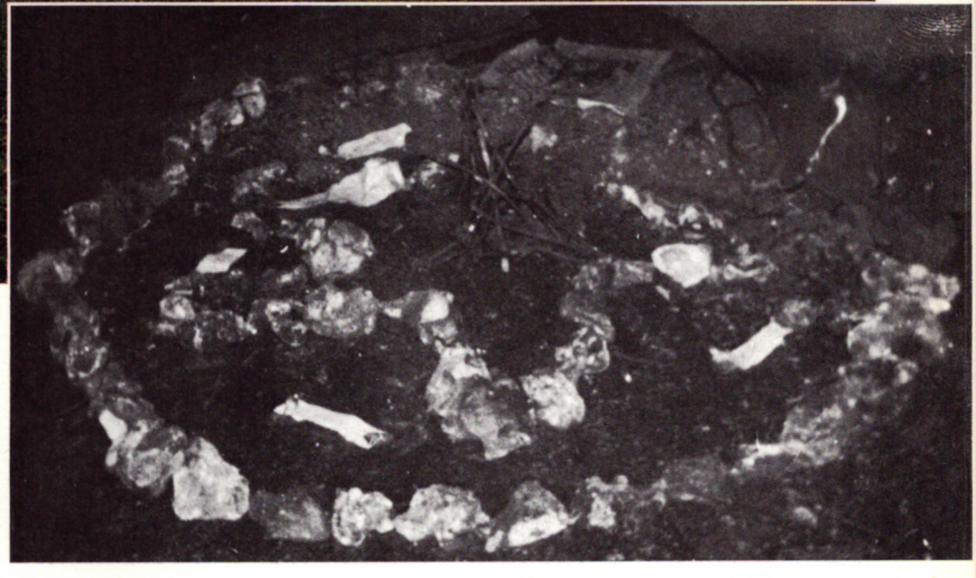
Above: *How they met themselves*, by Dante Gabriel Rossetti. The startled couple encounter apparitions of themselves – but time travellers could meet their physical selves according to Frank Tipler's theory

Right: Dr Who, one of the most famous of fictional time travellers, with his somewhat impractical design of time machine

Further reading

John Gribbin, *Timewarps*, J.M. Dent 1979
John Taylor, *Black holes*, Souvenir 1973
S. Weinberg, *The first three minutes*, Deutsch 1977

Where dark forces meet



Is there a force in the earth that creates inexplicable phenomena – or are the weird events like those associated with Chanctonbury Ring part of a little-understood interaction between the landscape and the mind? TOYNE NEWTON examines the evidence

THE SECOND CHAPTER of peculiar incidents associated with Chanctonbury Ring concerns the numerous UFO sightings that have occurred in the area.

One such took place during the night of 31 October 1972, at about 10.45 p.m. A Mr Simpson of Worthing was out walking with two friends at Chanctonbury. They saw a light flickering among the clump of trees, and at first thought it must be a bonfire. As they drew closer the light faded away. They were walking towards the centre of the ring when, said Mr Simpson, they saw 'the strangest object we have ever seen'.

The silence of the night was broken by a loud noise above them, as if something was brushing the tree-tops. Looking up, all three witnesses saw a dull red glow emanating from a large object above them.

'We were all three frozen to the spot,' Mr Simpson said, 'and we could not believe what we were clearly seeing with our own eyes. The object was making no sound whatsoever, apart from the noise when it brushed against the tree-tops. And although we watched it intently we did not break from the cover of the trees, as we felt safer whilst we were under them.'

As the object moved away, Mr Simpson said, they could see the top of the craft more clearly: 'It was illuminated by a much brighter blue light. We also noticed what appeared to be four small square windows or portholes.'

Everything was happening so quickly, however, and the object was moving away so fast that they could not be certain about the description. However, the craft came to a sudden halt, hovered for about 30 seconds, and then 'shot up into the sky at a terrific speed'.

A similar object was reported in the same area on 12 December 1979, but it did not come as close to the trees on this occasion. However it did spend some minutes hovering over the hill before suddenly moving off at high speed towards Brighton.

In the summer of 1974, a brilliant white

Top: inside the eerie wood that stands atop Chanctonbury Ring. The site seems to be a favourite target for UFOs in the area

Above: the occult altar found by local investigators in Chanctonbury Ring. Nine feet (3 metres) in diameter, it provides material evidence for what has long been local rumour – that the site is regularly used for purposes of 'black' magic

circular object was seen shooting up the west side of the hill, where it hovered for about 45 seconds before 'changing its shape to an oblong' and disappearing in a north-westerly direction at great speed.

On 23 August 1975 a bright orange object was seen in the sky over Cissbury Ring, near Worthing. The object hovered for a short while and then shot off at high speed in the direction of Chanctonbury Ring. (This was reported in the *Worthing Gazette* on 3 September 1975.) Within moments of the object being seen heading for Chanctonbury, a local woman (who does not wish to be named) was walking her dog at Chanctonbury Ring when she saw a 'large, saucer-shaped, bright orange object land on the west side of Chanctonbury Hill'. The woman went on to say that the object remained on the ground for no more than a minute or so, then shot straight up into the air. It was lost to sight within seconds.

Below: Cissbury Ring, over which UFOs have been frequently seen, immediately before heading towards Chanctonbury

Many similar sightings have been recorded. The usual pattern is for the UFO to be first seen at Cissbury Ring travelling towards Chanctonbury Ring, and then independently reported from the latter area.

Chanctonbury Ring is also well-known for being a venue for those pursuing witchcraft activities. From time to time hooded figures have been seen dancing around a bonfire amid the trees.

In March 1979 Charles Walker and Dave Stringer made an important discovery in this connection. While at Chanctonbury Ring they came across an unmistakable altar, formed out of a tree trunk. A 9-foot (3-metre) diameter circle of stones surrounded the altar. A five-point star, also made out of stones, rested within the circle. Thick paper or parchment bearing black candlewax lay between each star point.

The remains of a similar circle have been seen at nearby Devil's Dyke, where a black coven was known to be practising until December 1978. Grass has grown over the place, but the outline can still be seen. Also visible are the remains of what is thought to be a 'triangle of art', which is used to invoke or materialise a spirit (while the coven remains on the inside of the triangle for safety).

Devil's Dyke is a great cleft in the South Downs, south of the village of Poynings. Legend has it that the Devil himself dug the huge ditch when he thought the people of Sussex were too taken up with religion – the idea being that the sea would rush in and drown them all. Fortunately for the people of Sussex, however, he had got only halfway with the task when an old woman lit a candle, which set off the cock crowing. The Devil thought sunrise had come, and promptly fled. Perhaps not surprisingly, Devil's Dyke has also been the scene of mysterious events and UFO sightings.

During August 1974 Paul Glover was standing at Devil's Dyke on the site where the coven used to meet when he saw an orange and white disc-shaped UFO moving round the perimeter of the dyke. This was visible for two minutes. In April 1976, a group of watchers reported seeing two objects during their all night vigil, one at 12.55 a.m., when a 'white light' travelled west along the dyke and was visible for eight seconds, and another at 3.10 a.m. This time the object came to within half a mile (800 metres) of them before disappearing.

Above right: investigators Charles Walker and Paul Glover inspect ground markings apparently left by a 'black' coven at Devil's Dyke

Perhaps the most intriguing evidence relating to sightings in this area was discovered by Paul Glover. After a spate of UFO sightings in 1965 he was walking along the top edge of one of the banks of the dyke when he saw two strange rings imprinted in the ground. Despite extensive enquiries, the reason for their presence cannot be found. In 1979 he was still able to photograph them, 14 years after he had first noticed them.

Have UFOs landed at Devil's Dyke? Many people believe so, among them four schoolboys who, greatly impressed by local newspaper reports of the UFO activity at the dyke,

decided they would camp out there on the night of 12 July 1975. The father of one of the boys drove them there with a tent and camping equipment, saying he would pick them up again early the following morning. When he did so they had a strange tale to tell.

During the night they had positioned themselves about halfway up a steep bank at the dyke and lay staring up into the night sky. After some time, having decided that there were no UFOs to be seen, the four returned to the tent. It was then they became aware of a patch of mist in one specific spot – although the rest of the dyke was clear. Quite suddenly the mist became denser and seemed to be moving towards them. Then they all saw the patch seem to divide into five separate patches, forming semi-transparent figures. They were not clear cut images, but all the boys thought they were male, though they could not give any specific reason for arriving at such a conclusion. All four agreed, too, that when the figures were within 15 feet (5 metres) of them they began to fade. Right up to the point the 'images' disappeared, they remained five separate columns of mist, although they lost their man-like shapes slightly as they faded.

The boys (whose average age was 16 years) were all very frightened. One of them

is reported as saying: 'In fact we were glued to the spot for a few seconds and later considered leaving the dyke but we could not carry the heavy tent and as it had cost £60 we were not anxious to lose it. We decided that if we had seen five ghosts they could not harm us, so we decided to stay. When we examined the spot where we had seen the figures we were aware of a drop in temperature and we spent the rest of the night in the tent.'

Above: Devil's Dyke, a great cleft in the South Downs that legend says was dug by the Devil in the hope of drowning the God-fearing people of Sussex

Left: the mysterious rings at Devil's Dyke, which may be connected with a spate of UFO sightings in 1965

Connection or coincidence?

Chanctonbury Ring and Devil's Dyke are both connected by ley lines (four of them intersect at Chanctonbury). What significance should we attach to this link between the sites where so much unexplained phenomena occurs? What is the purpose of these mysterious unseen pathways? What forces do they contain? Can they affect the human brain, and do they provide some kind of homing device that attracts 'alien visitors'? Or is it merely coincidence that sightings and strange events have occurred in these ancient places? Or is there a further possibility – that such sites have, over generations, in some way absorbed the emotional energy that has been expended within their bounds, and actually *induce* peculiar events? In this case, they may trigger phenomena in the mind of the observer, or a suitable subject may trigger energy in the site. If there is any significance in these reports then we may be witnessing one of those curious interactions between the human psyche, time, and the world at large, in which phenomena that are not precisely material are produced – though they *are* material enough for independent observers to become aware of them.

This is not an especially far fetched idea, given the indubitable emotional power exerted by many places where great events have been experienced (sometimes quite recently), and given the strange – and so far still mysterious – properties that leys, standing stones and ancient sites do appear to have. Chanctonbury and the associated places nearby could lead us to a more comprehensive view of anomalous phenomena, in which it may become apparent that 'hauntings', UFOs, inexplicable forces and the rest are only different facets of a single aspect of what we fondly call reality. But to establish that, a great deal of concerted and concentrated research is required. Meanwhile, the odd events continue.

Post script

Your letters to THE UNEXPLAINED

Dear Sir,
In 1980 I carried out a considerable amount of research into the subject of Dracula for an English oral examination. I found that Dracula does not mean 'devil' as you say in 'The rise of Count Dracula' [issue 52], but that it comes from the Roman word *draco*, meaning 'dragon', and Dracula therefore means 'dragon's son'. Romanian is, after all, a Latin language.

In addition, it is believed that Dracula's father, Vlad III, was a member of the Order of the Dragon, a central European league of kings, princes and knights who tried to defeat the Ottoman empire. He was proud to belong to this league and put the dragon emblem on his coins and battle flags. His son, Vlad Dracula, was equally proud and so called himself 'son of the Dragon'.
Yours faithfully,
Thérèsa Fox Winnersh, Berkshire

Dear Sir,
On reading your article about Clapham Wood [issue 55], I was surprised – and rather reassured – to learn that other people too have had strange experiences in the wood. Last year I and a few other people visited a friend who lives in the area and we decided to go for a walk in the wood. At first it seemed a rather nice place, not at all hostile; but soon we all experienced a cold sensation as we passed through the area we now know is called The Chestnuts. It seemed as if some strange force were turning the air cold and still. Then I heard an odd rustling sound through the undergrowth and I drew this to the attention of my friends as quietly as I could. We tried to find the source of the noise, but couldn't see anything. When the sound stopped suddenly, I moved forward and kicked at the undergrowth, but there was nothing there. Then the noise began again. Eventually, however, the cold feeling disappeared, and we quickly left the wood; the place seemed to come alive again as we did so.

I still don't know what it was that made the sounds, but I am sure it was not an animal as we would have seen it. And it could not have been my imagination as all of us felt and heard the same things.
Yours faithfully,
J. Perry London

Dear Sir,
I should like to tell you about one of the ghosts I have seen. I have had several similar experiences, and they usually bring a warning of death; no words are spoken, but somehow I learn the name of the person who is going to die.

Over a period of several weeks, both my husband and I heard a high-pitched sound at night, when we were in bed. To begin with we thought it must be the wind in the overhead wires outside, but then we heard the sound when there was no wind. One night, just as the noise started, the curtains suddenly blew out into the room, even though the windows were closed. Then I saw a very tall lady standing at the foot of the bed. She was middle aged and had a kind face with a gentle smile; she wore a long, pale blue dress that was rather old-fashioned and she had long fair hair. She came round to my side of the bed and bent over me; she simply nodded at me, whereupon the name Aunt Frances came into my mind – she had died before I was born. I also had the distinct impression that an uncle of mine was going to die. The lady then went back to the foot of the bed, smiled and nodded her head, then disappeared. My husband had been awake all this time, but saw nothing.

The next morning I wrote to my mother about my experience and told her that my uncle was about to die. She said I must have been mistaken as he seemed full of life and energy: it was my grandmother who was very ill. However, a couple of weeks later my uncle did become ill and he died within three months.
Yours faithfully,
A.E. Yates (Mrs) Basildon, Essex

Dear Sir,
At about 7.30 one evening in the early summer of 1976, I was walking with a friend towards my home when we saw a few lights in the sky. We watched them as they changed colour from red to green to yellow. They seemed to form a disc shape, around the middle of which something was revolving, changing colour as it did so. The object seemed to hover for a short while, then it suddenly disappeared. We saw it again about 200 yards [180 metres] away: it hovered for a few minutes, then disappeared, again reappearing some distance away. Then it vanished.

Two weeks later my friend and I saw the object again, from more or less the same spot; this time we called my wife to look at it – she had seen a UFO before. We watched it for about five minutes, and it made about eight movements, appearing in different places. We were convinced that we had seen a UFO and that the object was there just for us to see.
Yours faithfully,
M. Lowther Liverpool

Dear Sir,
I think you may be interested in the 'twinning' experiences I have had with a friend. We have always said our lives run along parallel lines, in our thoughts and actions, for many extraordinary things happen. For example, one evening at about 9 o'clock I was reading the newspaper, when my nose started to bleed profusely (I never normally have nosebleeds). I said to my husband that my friend had hurt her nose. The next day, without mentioning my nosebleed, I asked her if she had hurt herself; she said that at about 9 p.m. she had slipped getting out of the bath and hit her nose on a shelf – but it had not bled at all.

On another occasion I was about to go shopping when I had a terrible pain in my head. I felt very dizzy and had to lie down. At the same time, I learned later, my friend had hit her head on a wall cupboard – again she felt no pain. (Incidentally, my friend has all the accidents, and I have her pain – but it doesn't work the other way round.)

These are just two of many similar experiences. We often say the same thing at the same time and we start to sing the same songs together.
Yours faithfully,
Janice Smith Wilmington, Kent

Send *your* letters to THE UNEXPLAINED, Orbis House, 20–22 Bedfordbury, London WC2N 4BT

Curiouser and curiouser

Some of the exciting new series to be featured soon in *The Unexplained*

Classics from the poltergeist file
A new series of occasional articles on classic poltergeist cases starts with an account of one of the best-documented examples of spontaneous PK ever – the lawyer's clerk from Rosenheim in Germany whose 'pooka' almost wrecked her office. **See issue 78**

Visions of the Virgin Mary
From time to time throughout the Christian era – and all over the world – visions of the Virgin Mary have appeared, bringing help, a message for mankind, or performing miracles. We assess the most reliable accounts and their significance. **See issue 78**

Visitors from the Pleiades?
In 1975 Eduard 'Billy' Meier, a Swiss farmer, had the first of over 130 meetings with cosmonauts from the Pleiades star cluster. We take a close look at this astonishing claim – and its documentation. **See issue 79**

Monsters of the American lakes
Canada and the United States abound in lakes – and the lakes, by all accounts, are teeming with unexplained forms of wild life. We describe the sightings and reports in a series by a world expert. **See issue 80**

Windows on another world?
The Bermuda Triangle may be a myth – but there *are* areas of the world that seem to attract unusual phenomena . . . or help create them. Are they 'windows' on another dimension? What explanation does science have? **See issue 81**

From the very depths of the sea
Unidentified flying objects that burst from beneath the waves . . . strange lights and signs . . . we describe reports of USOs – unidentified submarine objects – and the theories that may account for them. **See issue 82**

World enough and time
Every day we experience one of the world's greatest mysteries – time. We examine the nature of time, discuss timeslips and precognition, and show how philosophers, poets and scientists have tried to solve the problems posed by time. **See issue 83**